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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/511,683

10/19/2004

Noboru Yamamoto

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OLIFF & BERRIDGE, PLC

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EXAMINER

NGUYEN, THUONG

ART UNIT

PAPER NUMBER

2155

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/511,683

Applicant(s)

YAMAMOTO, NOBORU

Examiner

Thuong (Tina) T. Nguyen

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 19 October 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-11 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-4 and 10 is/are rejected.
- 7) ☒ Claim(s) 5-9 & 11 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date <u>1/13/05</u> | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. This action is in response to application 10/511,683 filed 10/19/04. Claims 1-11 are pending and represent method for parallel merge/sort processing device, method, and program.

Specification

2. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

Claim Objections

3. Claims 5, 8, 9 & 11 objected to because of the following informalities: Placing periods between the claim limitations. Appropriate correction is required.

4. Claims 3, 4, 7- 9 objected to because of the following informalities: Placing parenthesis between the claim limitations. Appropriate correction is required.

5. Claims 8-9 objected to under 37 CFR 1.75(c) as being in improper form because a multiple dependent claims depends on claim 5 & 7. See MPEP § 608.01(n).

Accordingly, the claims 8-9 not been further treated on the merits.

Claim Rejections - 35 USC § 112

6. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

7. Regarding claims 1-11, the phrase "merge/sort" and "merging/sorting" renders the claim indefinite because it is unclear whether the limitation(s) following the phrase are part of the claimed invention. See MPEP § 2173.05(d). Appropriate correction is required.

8. Regarding claims 5 & 11, the phrase "such as" renders the claim indefinite because it is unclear whether the limitation(s) following the phrase are part of the claimed invention. See MPEP § 2173.05(d). Appropriate correction is required.

9. Claims 3, 4, 7- 9 rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. It's unclear to the examiner if the claim limitation in the parenthesis is part of the claim limitation or just an explanation. Examiner suggests to remove those parenthesis.

10. Claims 1 & 10 rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. It's unclear to the examiner what is the "specific" number of sets? How to determined that "specific" number? Based on what factore?

Claim Rejections - 35 USC § 102

11. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

12. Claims 1-4 & 10 are rejected under 35 U.S.C. 102(b) as being anticipated by Fushimi Patent No. 5,903,780. Fushimi teaches the invention as claimed including data sorting device having multi-input comparator comparing data input from latch register and key value from storage devices (see abstract).

13. As to claim 1, Fushimi teaches a parallel merge/sort processing device, comprising:

parallel processors for merging/sorting that includes a plurality of processors for executing merge/sort processing for two input data strings (figure 1; col 1, lines 7-16 & 38-43; Fushimi discloses that the device of selecting processors for executing the sorting methods);

parallel processors for dividing data string pairs for sub-dividing two sorted data string pairs to be the input of the merge/sort processing into a specified number of sets of partial data string pairs (col 1, lines 66 – col 2, lines 23; Fushimi disclose that the device of dividing the string into combination string); and

a processor for management for controlling the entire system, characterized in that said processor for management assigns a plurality of partial data string pairs

received from said parallel processor group for division to said parallel processors for merging/sorting respectively to execute merge processing in parallel (col 9, lines 56 – col 10, lines 63; Fushimi disclose that the device of processing the division and sorting method).

14. As to claim 2, Fushimi teaches the parallel device as recited in claim 1, characterized in that said parallel processors for merging/sorting to which a pair of partial data strings is assigned execute the merge processing independently and output the result to a pre-instructed output area, and the whole of these output areas become the final merge result or is output as an intermediate merge result so as to be used for the parallel merging in the next step (col 6, lines 1-20; Fushimi disclose that the device of pre-processing for the process).

15. As to claim 3, Fushimi teaches the parallel device as recited in claim 2, characterized in that two processors are assigned to said partial data string pairs respectively, the first processor executes merge processing in descending order (merging said partial data string pair from the edge at which the key value is greater to the side at which the key value is smaller, and writing the output sequentially from the edge at which a key value is greater to the side at which the key value is smaller in said output area), and the second processor executes the merge processing in ascending order (merging said partial data string pair from the edge at which a key value is smaller to the side at which a key value is greater, and writing the output sequentially from the edge at which the key value is smaller to the side the key value is greater in said output

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area) (col 6, lines 48 – col 7, lines 4; Fushimi disclose that the device of performing the operation for the plurality of processors).

16. As to claim 4, Fushimi teaches the parallel device as recited in claim 1, characterized in that the following items are satisfied as said division conditions:

the sorted data string D comprised of n number of data is expressed as (D, n) and a pair of two data strings is expressed as $\{(D_1, n), (D_2, n)\}$;

when the sorted data string pair $\{(D_1, n), (D_2, n)\}$ as divided into two partial data string pairs $\{(D_{11}, n_{11}), (D_{21}, n_{21})\}$ and $\{(D_{12}, n_{12}), (D_{22}, n_{22})\}$, (smaller one of the key values of the last part of the data in the partial data strings D_{11} and D_{21}) \geq (greater one of the key values of the first part of the data in the partial data strings D_{12} and D_{22}) is established, and also $n_{11} + n_{21} = 2x$, $n_{12} + n_{22} = 2(n - x)$ is established, where x is half the value of the number of data counted from the first part of D_1 and D_2 in the area pair (rejected as quicksort method).

17. As to claim 10, Fushimi teaches a parallel merge/sort processing method for sub-dividing two sets of sorted data string pairs into a plurality of sorted data string pairs so as to enable sort by a merge/sort operation at an arbitrary parallelism, comprising:

a step of providing a pair of first sorted data string and a second sorted data string (figure 1; col 1, lines 7-16 & 38-43; Fushimi discloses that the method of selecting processors for executing the sorting methods);

a division step of sub-dividing the pair of said first data string and said second data string into a plurality of sorted partial data string pairs according to a required

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parallelism (col 1, lines 66 – col 2, lines 23; Fushimi disclose that the method of dividing the string into combination string); and

a step of merging the sub-divided sorted partial data string pairs in parallel, characterized in that data strings without any inconsistency in the entire key arrangement can be output regardless the logarithm of the sub-divided sorted partial data string (col 9, lines 56 – col 10, lines 63; Fushimi disclose that the method of processing the division and sorting method).

Allowable Subject Matter

18. Claim 8 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

19. Claims 5-7, 9 & 11 are objected to be allowable if corrected those errors stated in the previous paragraphs.

20. The following is an examiner's statement of reasons for objected the claims :

In interpreting the claims, in light of the specification filed on 10/19/04, the Examiner finds the claimed invention to be patentably distinct form the prior art of record.

21. Fushimi et al. (US 5,903,780), teach data sorting device having multi-input comparator comparing data input from latch register and key value storage devices wherein parallel processors for sorting that includes a plurality of processors for executing data strings (abstract; col 1, lines 7-16 & 38-43).

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22. Huang et al. (US 5,721,957), teach method and system for storing data in cache and retrieving data from cache in a selected one of multiple data formats, wherein dividing data string pairs for sub-dividing tow sorted data (abstract; figure 3).

23. The following is an examiner's statement of reasons for objected the claims to be allowed:

The examiner has found that the prior art of record does not appear to teach or suggest or render obvious the claimed limitations in combination with the specific added limitations as recited in dependent claims. The prior art of record fails to teach or suggest individually or in combination of divide a sorted data string pair into sets of two-division operations in which total of the number of data counted and dividing a data string and acquiring a plurality of unsorted data strings and assigning a processor to said plurality of partial data and applying a quicksort method to the assigned processor based on arbitrary algorithm and creating an input data string pair which were acquired in the third step and repeating said step using the merge-processed sorted partial data string . Claims 5-11 are object to be allowed because of the combination of other limitations and the limitation listed above.

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tina Nguyen whose telephone number is 571-272-3864,


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and the fax number is 571-273-3864. The examiner can normally be reached on 8:00 AM-5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Saleh Najjar can be reached on 571-272-4006. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Thuong (Tina) Nguyen
Patent Examiner/Art Unit 2155


PHILIP TRAN
PRIMARY EXAMINER